DST 4050: EMBEDDED REAL-TIME SYSTEMS

Prerequisites: APT 2050: Computer Network and Telecommunication

3 Credits

Course Description

The course introduces the concepts of distributed real time systems, queuing systems, issues of embedded hardware design

Course Rationale

Most of the real time application utilizes the concept of embedded systems. Student should have a mastery of embedded systems as they prepare themselves to develop real time systems. The goal of this course is to familiarize students with the issues and technologies involved in designing real-time and hardware-resource constrained systems. Design engineers are often called upon to make decisions about general purpose computing solutions vs. specialized hardware solutions, this course will give students the tools to intelligently make the necessary tradeoffs and understand the business consequences of their choices..

Learning outcomes

At the end of the course, students will be able to :

- understand hardware and software systems consisting of an embedded processor, an electronic interface, and a physical plant,
- develop analytical skills and design tools at the intersection of engineering and computer science,
- build (as part of a group) sensory and motor drivers, I/O, and control logic for an embedded application.

Course Contents:

Digital logic and Boolean Algebra .sequential logic .number representations and arithmetic. Basic processor design .embedded system development environments .processor input/output implementations and electronic interfaces. Serial protocols and implementation .distributed real time systems. Queuing for real-time systems. Real time for adaptive systems. Basics of operating systems (including concurrency and real-time issues), and .issues in embedded hardware design.

Teaching and Learning Methodologies

Instruction will consist of both classroom lectures and computer lab tutorials and exercises.

Instructional material & equipment

Textbooks, whiteboard, handouts, electronic projector and laptop, Internet access, and the library.

Methods of evaluation

Class assignments, take-home assignments, tests, small projects to demonstrate use and application of parallel Computing

Laboratory Work	20%
Project	20%
Assignments	10%
Mid-semester	20%
Final semester exams	30%
Total	**100%**

Course Text: Real-Time Embedded Components and Systems by Sam Siewart 2006